

The BLAST Internal Gas Target at the MIT-Bates Linear Accelerator Center

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The Bates Large Acceptance Spectrometer Toroid (BLAST) [1] is a detector designed to study the spin dependent electromagnetic response of few-body nuclei at momentum transfers up to 1 (GeV/c)². The strength of the experiment lies in its unique combination of large acceptance spectrometer and highly polarized electron beam and dilution free internal gas targets. Targets that will be used include polarized H, D, and He3 as well as unpolarized gases of high density.

The Atomic Beam Source (ABS) [2,3] which operated in the NIKHEF AmPS electron ring throughout the 1990's was delivered to Bates to be installed in the BLAST experiment. The high magnetic field of the toroid magnet of up to 0.18T in which the ABS is located required a redesign of crucial components of the ABS to ensure high performance. The ABS will be able to deliver a vector polarized hydrogen and a vector or tensor polarized deuterium target. Measurements of either the degree of dissociation of the target gas or the tensor polarization of the deuterium target can be achieved with an ion polarimeter [4,5]. At present the BLAST experiment is being commissioned and the ABS target is being installed. We report on recent developments on the ABS target and the ABS setup within the BLAST spectrometer.

[1] R. Arlacon et al., Nucl. Phys. A 663-664, 1111 (2000)

[2] L.-D. van Buuren et al., Nucl. Phys. A 663-664, 1049 (2000)

[3] D. Szczerba et al., Nucl. Inst. Meth. A 455, 769 (2000)

[4] J.-S. Price, W. Haeberli et al., Nucl. Inst. Meth. A 326, 416 (1993)

[5] Z.-L. Zhou et al., Nucl. Inst. Meth. A 379, 212 (1996)